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ROYAL SOCIETY OF MEDICINE—SECTION OF LARYNGOLOGY.

December 5, 1930.

President—Mr. FRANK ROSE, F.R.C.S.

Plastic Repair after Operations on the Upper Jaw.

E. MUSGRAVE WOODMAN, M.S.

(1) *Avoidance of Deformity.* — Deformity after operations for malignant disease of the upper jaw should never take place, provided that cases are seen sufficiently early and that the operation is carried out on scientific and artistic lines.

The earliest description of this operation I have been able to find is by Richard Wiseman, Sergeant Surgeon to King Charles II., who, in 1671, described a patient with this condition in the following words:—

> "A man, about 28 years of age, came out of the country with a cancer on his left cheek, extending from the side of his nose, close under the lower eyelid to the external canthus, so making a compass downwards. It was broad in its basis, and rose capped like a sugar-loaf. The cancer threatened his eye with inflammation, and he hastened up and he importuned me to undertake it."

Any operation undertaken on such a patient is clearly destined to lead to severe deformity. When the soft tissues and skin of the cheek are invaded, deformity is inevitable, whether the operation is undertaken by the scalpel, by radium, or by diathermy.

It is remarkable how rarely the external parts of the nose itself are invaded, but when this takes place a new nose must be constructed.

The unhealthy, baggy swelling sometimes seen below the eyelid on the affected side must be avoided. The old transverse incision below the eyelid must be relinquished, and the method mentioned by Trotter, through the inferior fornix of the eye, should be used, or the one which the author introduced, and always uses, which commences in the eyebrow and extends down the side of the nose, the eye being temporarily displaced outwards.

A gap, due to failure to unite in the region of the inner side of the nose near the inner canthus of the eye, is particularly difficult to close, except by elaborate plastic repair. Union can best be attained

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by uniting the periosteum by a separate layer of buried catgut sutures and then suturing the skin very accurately by carefully placed silk sutures.

Dislocation of the eyeball must be guarded against. If possible the infra-orbital margin of bone should be retained; failing this, the suspensory ligament of the eye should be left. Even in the worst cases the eye can be saved by packing the cavity tightly with gauze soaked in bismuth, iodoform and saline (all sterilised), and held in position by a "Stent" temporary dental plate.

Perforation of the palate should not be regarded as a deformity. Increasing experience leads me more strongly than ever to teach that an opening for inspection should be made in the palate in every case; without this it is impossible to watch the operation area effectively over the necessary period of time. This opening is controlled by a denture, which is held in position very effectively by two soft rubber extensions into the opening and enables the patient to speak and eat freely.

(2) *Plastic Repair of Postoperative Deformity.* Nose.—The nose is frequently destroyed by the ravages of syphilis, tubercle, and war, but rarely by malignant disease.

Repair is undertaken readily by swinging a flap down from the forehead by the method introduced by Sir Harold Gillies, to whom I owe my interest in this subject. (Cases I. and II.)

In the last case of the kind in which I have operated I deliberately took a portion of the hairy scalp at the end of the flap to implant on the side of the nose and then depilated it by X-rays; by so doing, a scar on the forehead was avoided. (Case III.)

Face.—A large opening in the cheek can be remedied by a swing of a tube graft from the chest to the malar region (monocle swing). This is the first operation. At a second, a portion of rib cartilage is inserted in the grafted tube, with its tip near the upper end. At a third operation the upper end of the tube is split and is laid across the opening, the inner skin layer lines the antrum, the outer forms the external covering, while the cartilage supports the bridge.

Much more difficult is the repair when the eye has gone as well. Attempts, in my hands, to lay a large fat tube across the face and fix it to the side of the remains of the nose (*e.g.*, septum), and to leave an opening above to form a new orbital cavity, have proved a failure.

The fact is that the tube will not hold in this position and the only way I have found possible is to close the whole opening and fix the upper edge of the tube to the forehead, just below the eyebrows.

Mouth.—While I find the nose easy to repair, and the face more difficult, the mouth represents the height of difficulty.

The case illustrated shows a man with an advanced growth of the upper and lower lips and angle of the mouth on the right side. The

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growth was effectively destroyed by diathermy and there has been no recurrence. As a necessary result of the operation, half his mouth was destroyed and the result was a facial expression which resembled a sardonic grin. Saliva dribbled constantly and food during mastication fell out of his mouth in lumps. (Case V.)

Repair was undertaken by a chest pedicle flap to the angle of the mouth, and then by a series of swings to form anew the upper and lower lips. At first the angle of the mouth on the right side formed a ring. This was rectified by a series of adjustments. The final result was a partial failure. The patient was able to retain his saliva and masticate his food, but his appearance remains to this day the reverse of pleasing. This case was one of extreme difficulty, owing to the mobility of the mouth and the frequent use of the parts in expression. A repair of the upper lip alone is comparatively easy and is undertaken along similar lines.

(3) *Dental Cosmetic Repair.*—The assistance of a skilled dental surgeon is of great value to the surgeon in carrying out the repair of the ravages of operation in his cases.

When a part of, or the entire half of, the palate has been removed, a temporary plate can be made and fitted in position a few hours after operation. This enables the patient to eat and swallow well and to retain the dressings in the cavity in a clean and healthy condition. Later on a more permanent plate with an intra-antral rubber extension serves to fill out the cheek and prevent that retraction and deformity which are liable to occur.

Again, when a large portion of the face has been removed and the patient, owing to age or disinclination, is unsuitable for surgical repair, a vulcanite shield can be fitted exactly in position and attached below to a dental plate, which may be externally coloured or even painted to match the face. Lastly, when the supports for the nose have gone, but the external cutaneous covering remains, deformity can be entirely rectified by a vulcanite support fixed to the dental plate.

In conclusion, it is evident that the ravages of disease and its cure by operation can be ameliorated and rendered inconspicuous by the great art of plastic surgery, ably seconded by the improvement in mechanical dental technique available at the present day.

ILLUSTRATIVE CASES.

I. W. P., female, aged 23.

Condition on Admission.—Destruction of nose by lupus (now inactive). Right ala atrophied ; left ala deficient ; no nasal tip.

Plastic Operations.—(1) November 1926—Forehead flap turned down, and sutured over end of nose. (2) December 1926—Tip of flap shaped to nose, and forehead pedicle returned.

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II. L. P., female, aged 23.

Condition on Admission (1927).—Extensive destruction of alae nasi and tip of nose by lupus, of twelve years' standing. Tissues anæmic and unhealthy.

Plastic Operation.—May 1927—Grafting of portions of whole thickness of skin from the abdominal wall *in situ.*

Result.—Aseptic necrosis and failure.

III. Mrs. G., aged 62.

Condition on Admission.—June 1926—Squamous epithelioma following rodent ulcer in left angle of orbit. Deep ulcerated hole, leading into nose, both upper and lower lids affected.

Operation.—Excision of growth ; and diathermy ; removal of the eye.

Plastic Operations.—(1) May 1930—Isolation of forehead and scalp flap to make a pedicle. Turbinate swing to form support in nose for graft. Suture at end of flap in position over nose. (2) June 1930—Return of pedicle flap to forehead. Depilation of flap on nose by X-rays.

IV. S. B., female, aged 35.

Condition on Admission.—July 1924—Large fungating mass filling whole of right orbit, and extending into right nostril ; right eye destroyed.

Operation.—Whole of right maxilla, including orbital contents, removed.

Plastic Operations.—(1) July 1925—Tube graft isolated from abdominal wall and cartilage engrafted. (2) January 1926—Swing to right side of cheek. (3) March 1926—Swing across cavity to attach to side of nose. Attachment subsequently broke down. (4) June 1926—Swing across to attach to forehead above.

Eye socket to be made later.

V. D. B., male, aged 46.

Condition on Admission.—Large fungating carcinoma involving two-thirds of upper lip, right angle of mouth and half of lower lip.

Primary Operation.—August 1922—Diathermy and whole area removed right down to the mucous membrane covering the jaw and including the fornices.

Plastic Operations.—(1) August 1923—Tube graft isolated from thorax. (2) September 1923—Tube graft transplanted to neck. (3) October 1923—Tube graft to angle of mouth. (4) June 1925—Tube graft shaped round upper and lower lip areas.

Discussion.

Mr. T. P. Kilner said that as a surgeon dealing with cases only from the reconstructive point of view, he was full of admiration for Mr. Woodman, who tackled both removal and replacement. Such a combination had, however, one definite advantage: it allowed for the preparation of the ground for future plastic operations. The turning-in of skin edges and the suturing of skin to mucous membrane around the margins of a defect followed the practice of Sir Harold Gillies and himself.

He would like to hear something further about epilation of skin, for he had found no satisfactory means of destroying hair in skin areas intended for those in turned lining flaps so well illustrated in Mr. Colledge's

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cases (pp. 411 and 412). X-rays, if used in doses sufficient to destroy hair follicles, destroyed also the vitality of the flaps.

He sympathised with Mr. Woodman in the disappointments he had experienced in attempting to reconstruct eyelids or lips by means of the tubed pedicle flap. The reconstructed parts almost always had the immobile thick appearance described. He recalled a case of extensive loss in the orbital region caused by the explosion of a Verey light in which, after closing-in the defect, he had attempted to reconstruct a cavity capable of holding an artificial eye. The attempt was abandoned because of the peculiar appearance given by the immobile masses representing the new eyelids. He contented himself with supplying the man with a simple shade to hide the absence of the eye.

He thought that Mr. Woodman was perhaps a little unnecessarily afraid of the scarring produced by the use of the forehead for these repairs. The forehead flap was ideal for this work, for it matched the surrounding face skin perfectly and had the additional advantage of being hairless when required for lining. Further, the secondary defect in the forehead lent itself admirably to free skin-grafting.

Mr. MUSGRAVE WOODMAN (in reply) said it was a mistake to suppose that he was afraid of using the skin of the forehead for flaps. When he had utilised the skin in the scalp region, his object had been to avoid a permanent scar. He agreed that forehead skin was ideal for the purpose. The surgeon who could prepare his cases with a view to subsequent plastic repair was at a great advantage over the man who obtained them only after the damage had been done.

Repair of Pharyngeal Defects after Operations for Removal of Malignant Tumours.

LIONEL COLLEDGE, F.R.C.S.

These openings may occur as a complication after total removal of the larynx, or after lateral pharyngotomy, or they may be deliberately produced by removal of the larynx with either a portion or a complete segment of the pharynx, or by a lateral pharyngotomy in which such an amount of the lateral wall is removed that an opening is inevitable.

When such an opening occurs as a complication, the usual cause is wound infection, but defective nutrition of the skin may also produce one, either because the flaps have been designed with an insufficient blood supply, or because the skin has been damaged by radiation. To avoid wound infection, the mouth must be properly prepared and two or three weeks' interval must be allowed after the extraction of teeth. During the operation the wound must be kept free from pharyngeal mucus and the pharyngeal opening be closed securely. There is less liability to the formation of a pharyngostome after laryngectomy if one large flap with its base at the hyoid bone is used, as the flap covers the suture line of the pharynx and the two lines of sutures in skin and pharynx do not coincide. No form of skin-flap,

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however, will compensate for defective technique. When X-rays have been used on the pharynx I think it is generally safer to stitch the pharynx to the skin and produce a pharyngostome. Healing is then obtained with less liability to sloughing, and the pharyngostome can be repaired later. I have not found that radium applied in needles, for intrinsic cancer of the larynx, makes much difference to the healing of a subsequent laryngectomy. It is not necessary to refuse to operate on cases in which radiation has been used previously, but the fact must be taken into consideration in planning the operation. The bad results, however, which have made some surgeons refuse to operate on irradiated cases, teach their lesson, and my own experience in this connection is not very large. I do not think that irradiation is of any assistance either in eradicating the tumour surgically or in obtaining healing of the wound. I have not, however, had any cases in which the skin has been burned. The deep X-ray therapy has always been skilfully applied and the wounds have healed well after the plastic operations.

Concerning the actual closure of these pharyngostomes I have nothing fresh to say, but there are certain principles which must be faithfully observed if the opening is to be closed by a single act, for it is generally useless to freshen the edges and unite them unless the opening is quite small. It is also useless to slide a single flap across the opening, leaving an inner raw surface exposed to contamination by mucus and saliva. The gap must be closed by a double layer of tissue, which presents a lining of skin or mucous membrane facing inwards and of skin facing outwards. There may be sufficient mucous membrane to enable it to be detached from its junction with the skin, turned inwards and sutured, but it is usually necessary to dissect up skin flaps around the opening and turn them so that the epithelial surfaces look inwards. In this case the flaps of skin are completely cut off from their original blood supply, and sufficient interval—three or four months—must have elapsed for the skin to have acquired a fresh vascular connection in the new position. I use fine silk for deep sutures on account of its strength, inserting two rows and avoiding perforation of the epithelial surface by the stitch holes.

This leaves a large raw surface facing outwards, which must be covered by a flap taken from the immediate neighbourhood. The loose skin below the horizontal ramus of the lower jaw is usually available for this, but it may be taken wherever available, provided that the flap is thick, has a good blood supply which is not obstructed by rotating the pedicle, and is large enough to cover the surface without tension when stitched into position. In this way no raw surface is left exposed, the suture lines in the two layers do not coincide, and healing is obtained by first intention. There is no actual loss of skin

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in these cases, though a large amount may be required to replace the mucous membrane of the pharynx, and I have always found sufficient skin available locally without bringing it from a distance by a tubed pedicle.

The cases shown illustrate these points. If the skin to be turned inwards contains hair follicles, it is advisable to have it epilated before the operation, otherwise the hairs grow inside the pharynx and cause irritation.

ILLUSTRATIVE CASES.

I. *Intrinsic Carcinoma.*—Male, aged 55. Had been hoarse for about eight months. Sir St Clair Thomson found the left cord fixed by a flat growth on the cord, bulging out the ventricle above and dipping into the subglottic area below. Growth extended backwards to tip of arytenoid and forwards into base of epiglottis and anterior end of opposite cord. He therefore referred the case for laryngectomy. As doubt had been raised concerning the diagnosis, a preliminary biopsy was performed to confirm the malignant character of the lesion.

14th March 1930.—Laryngectomy performed by raising a single flap with its base at the hyoid bone. The case shows how the situation of the opening into the pharynx is covered by this form of skin-flap.

II. *Post-cricoid Carcinoma.*—Female, aged 58. For five months had noticed some soreness in throat with cough and phlegm, but not much dysphagia and loss of weight. Voice normal. Œdema of pharynx behind arytenoids. Vocal cords movable. Thin woman with much pulsation at root of the neck and a "slapping" impulse thought to indicate an aortic lesion. No glands palpable.

12th April 1930.—Removal of larynx with a complete ring of lower pharynx and upper end of œsophagus, 4 inches long, the growth being 2½ inches long and extending round the circumference except for a narrow space on the posterior wall. Glands on both sides of neck cleared at same time. On account of the consequent defect in the pharynx and œsophagus after healing, the patient wore a Gluck's tube, through which she swallowed without leakage until 26th September.

The front of the pharynx and œsophagus was then reconstructed from skin flaps. Normal swallowing was established in ten days without any leakage. The state of the patient is the same as after simple laryngectomy.

III. *Carcinoma of Pharynx.*—Female, aged 65. Frail physique. Had noticed irritation in throat for nine months, and recently some hoarseness and difficulty in swallowing, especially of saliva. Breathed badly at night. Epithelioma on right aryepiglottic fold extending on to lateral wall of pharynx and reaching almost to lower pole of right tonsil. Some glands palpable on right side of neck along the course of the internal jugular veins. Had auricular fibrillation and had been under treatment for heart failure. Seen by Mr. L. Graham Brown, who advised operation.

1st July 1930.—Right side of neck cleared of glands, and growth removed by lateral pharyngotomy. Through gap remaining epiglottis and opposite side of larynx could be seen.

10th October.—Opening closed by skin flaps. No leakage, and patient began to swallow normally four days afterwards.

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IV. *Rapidly Increasing Carcinoma of Pharynx.*—Male, aged 55. Voice altered for several months; lately dysphagia; for ten days had been unable to swallow solid food. Ulcerating growth on left aryepiglottic fold and lateral wall of pharynx, also occupying entrance to pyriform fossa and reaching to mid-line on back of larynx. Thick, fleshy neck with no palpable glands. Mouth cleared eight days before operation.

2nd August 1930.—Neck cleared of glands and growth removed by lateral pharyngotomy. The epithelioma was the size of a florin, so that the piece removed measured about 2 in. in diameter. Raw surface covered by turning in a flap of skin from anterior part of wound. After healing, a long narrow cleft was left in lateral wall of pharynx. Dr. Hugh Gordon epilated the skin lining the pharynx where the mucous membrane had been replaced.

4th November.—Opening was closed by skin flaps. No leakage. Normal swallowing for soft solids established in nine days' time.

DISCUSSION.

The PRESIDENT said he understood Mr. Colledge to say that in the case of one of his patients the swallowing was normal; did Mr. Colledge mean that statement to be taken literally, or were there reservations?

Mr. T. B. JOBSON asked where the line was drawn between operability and non-operability. Some of the cases now shown would have been regarded as inoperable a few years ago.

Mr. LAWSON WHALE asked—with regard to the case in which Mr. Colledge had removed the left side of the larynx and a large strip of the pharyngeal wall—how, since he lined that with a flap of skin turned inwards, he constructed the party-wall between what remained of the larynx and the pharynx?

Mr. MUSGRAVE WOODMAN asked whether Mr. Colledge had tried epilating the skin with X-rays before operation. He (the speaker) had a patient on whom he had performed this operation three years ago, and who periodically came up to have the beard cut as it grew in his pharynx when it reached the remainder of the epiglottis and tickled him.

Mr. LIONEL COLLEDGE, in reply to the President, said that the patient referred to now swallowed without any difficulty; the reason, he believed, was that the superior and middle constrictors were intact. The lower part of the inferior constrictor must have been totally removed. There was now no obstruction.

The question of operability scarcely came into this discussion. If the tumour could be removed, and if the resulting defect could be repaired by a plastic operation so as to give the patient a reasonably comfortable existence, he saw no reason to refrain from operating.

Mr. Lawson Whale had asked about re-forming the party-wall between pharynx and larynx. Mr. Trotter went rather further in that direction than he (the speaker) had attempted. It was difficult, because there must be a skin surface facing towards the larynx, and another facing towards the pharynx, and the first one was apt to prolapse forwards and obstruct the larynx. Half of the larynx could easily be repaired, as in the three patients

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he demonstrated. If there was any large amount of septum between the pharynx and larynx to be removed, the procedure should be that adopted in Case II., in preference to an attempt at a plastic operation with a folded skin flap.

The hair growing inside the pharynx raised an important point, and he did not think X-ray epilation was suitable. Two patients sent to him by Mr. Mollison had both been treated by heavy doses of X-rays, but this had not hindered the progress of the tumour. They were bare of hair when under the care of the speaker, and he treated them by an operation much on the lines of that in Case III, except that there was a strip of pharynx left at the back in both. The pharynx was repaired by turning up skin from the neck, and another piece of skin from the outside. Both grew hair in the pharynx later, and in one this caused some trouble. The other was not troubled by the hair at all. The hair therefore should be removed before the plastic operation. Dr. Gordon, of the Skin Department at St. George's Hospital, saw the fourth patient exhibited and thought X-rays would not be effective, and that radium would take a long time and perhaps would damage the skin; he therefore removed each hair separately by diathermy. He (the speaker) did not know what the ultimate result would be, but it was satisfactory so far, and he would try it again in other cases.

The Use of Carbon Dioxide in the Treatment of Vasomotor Rhinitis, Hay Fever and Asthma.

ARTHUR F. HURST, M.D.

In the summer of 1925 I visited Mont Dore, "la providence des asthmatiques," as it is known in France. It is one of the coldest and rainiest places in France, but it is situated 3500 feet above sea level, so that its altitude exerts a favourable influence on many visitors. Drinking the waters is regarded as an essential part of the treatment, but I cannot help doubting whether the trace of arsenic they contain can have any beneficial action. Walking round a room filled with the vapour of Mont Dore water at a temperature of 90° F. is the treatment upon which the physicians there lay most stress, on account of the "sédatif, décongestif, détersif, dérivatif, anticatarrhal et anti-spasmodique" action which the vapour is said to exert on the bronchi, and there is no doubt that it helps many asthmatics. A nasal douche of the gases derived from the Mont Dore water, consisting of over 99 per cent. of carbon dioxide, for from five to fifteen minutes, is very commonly used. It produces a slight tingling sensation, and occasionally a burning feeling at the top of the head—probably when some of the gas enters the sinuses. Though it is claimed that the inhalation owes most of its success in the treatment of nasal catarrh to the fact that the gases are a natural product, I was so much impressed by the improvement which occurred in my own case that I thought a douche of ordinary carbon dioxide would be worth a trial at home. Before my visit I had been suffering from vasomotor

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rhinitis, and almost always had a running nose, with paroxysmal attacks of sneezing and rhinorrhœa. The one thing which Mont Dore did for me was to improve the condition of my nose.

For a long time I was unable to obtain a satisfactory apparatus, as the manufacturers would supply the gas only in enormous cylinders, and it proved impossible to make a generating plant which was safe as well as small. A year ago I saw Sir Francis Shipway give an anæsthetic with which he mixed carbon dioxide from a small cylinder in order to make the patient breathe more deeply. This apparatus is now supplied with a rubber tube, at the end of which a nose-piece is attached. The nose-piece is inserted in a glass of water, and the screw on the top of the apparatus is then very slowly turned in an anti-clockwise direction until a moderately rapid stream of small bubbles is seen to issue from the tube. The nose-piece is then dried and inserted into one nostril. The patient should breathe through his mouth and the gas should be allowed to flow into the nose without being actually inhaled.

In cases of vasomotor rhinitis the treatment should be given for from five to ten minutes up each nostril every morning. In hay fever this should be done throughout the hay fever season, and in addition the gas should be used as often as necessary during the day immediately an attack threatens to begin and continued until it passes off. For paroxysmal sneezing and nose-running the treatment should also be given immediately an attack begins. In cases of asthma which begin with an attack of this kind, the gas may prevent the attack from developing.

The treatment has proved of great value in a considerable number of cases of hay fever and other forms of paroxysmal rhinorrhœa and sneezing. It has often a remarkable effect in vasomotor rhinitis, and is sometimes useful even when the condition is in part due to infection, though I do not suppose that it can exert any antiseptic action. Exactly how it works I do not know, but the action is certainly a direct one on the nasal mucous membrane and is quite distinct from that produced on the respiratory centre by the inhalation of carbon dioxide.

REFERENCE.—A. F. Hurst, "The Treatment of Asthma at Mont Dore," *Guy's Hosp. Rep.*, 1925, lxxv., 58.

DISCUSSION.

Dr. J. S. FRASER asked whether Dr. Hurst could give any explanation of how the carbon dioxide acted.

Mr. POPPER said he had been to Mont Dore, and he understood from an eminent doctor at the place that the irrigation with carbon dioxide was regarded as their sheet anchor in the treatment of nasal conditions.

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Mr. CYRIL HORSFORD said that he had visited Bad Ems recently, and had been surprised and impressed by the new sanatorium, of which Dr. Diener was in charge. He was told that Dr. Diener was regarded as the authority in Germany on asthma, and he had been charged with investigating the subject. There a powder was vaporised, so that patients received the dried extract of Ems water in a volatilised form. Patients entered chambers at various pressures, and the treatment was said to have a marked effect on the asthma.

Dr. HURST (in reply) said he wished that he could explain the action of the carbon dioxide, but he was certain that the benefit was due to a local action on the nose ; it was not a question of inhalation but of a direct action on the nasal mucous membrane.

The PRESIDENT said that oxygen had had its boom, and now it appeared that carbon dioxide was having its turn.

Extrinsic Tumour in Right Posterior Mediastinum, causing Temporary Dysphagia—HERBERT TILLEY, F.R.C.S.—Dr. K. T. G., aged 37, first complained of dysphagia June 1930, followed shortly afterwards by pain in mid-sternal region on swallowing: noticed a zone of hyper-æsthesia in same region. 11.7.30.—Sense of pain on swallowing solids or liquids. No physical signs in chest. 25.7.30.—X-ray examination showed obstruction in the mid-thoracic region caused by an oval tumour about the size of a hen's egg pressing on the wall of the gullet. 28.7.30.—Œsophagoscopy revealed narrowing of gullet but no lesion of the mucous membrane and a full-sized Jackson bougie passed easily without causing bleeding. Difficulty and pain on swallowing were much relieved and quite disappeared by 7.8.30; weight had increased by 14 lb. Present condition normal. (The patient's mother died from "intestinal tuberculosis," aged 36.)

X-ray Examination.—"An oblique view of the chest shows a well-defined ovoid shadow in the posterior mediastinum at the level of 5th and 6th dorsal vertebrae. The barium swallow is held up temporarily just below the arch of the aorta and then passes down in a thin layer, outlining the opacity referred to above. This mass is apparently compressing the œsophagus from behind. The mass has not the typical appearance of a mass of glands and there is nothing in the dorsal spine to suggest a tubercular abscess. The appearance would be compatible with a benign tumour or cyst, since the smooth outline of the mass and the way it is pressing against the œsophagus (without apparently invading it) are against it being of a malignant nature." (A. J. Peake for Dr. Salmond.)

The patient was in the care of Dr. Batty Shaw (University College Hospital), who sent him to me for œsophagoscopy.

It is possible that the obstruction of the œsophagus was caused by

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a temporary enlargement of a lymphatic gland outside the œsophagus. Such temporary enlargement may have been due to septic infection in the neighbourhood, but of this there was no evidence. Or it might have been that the temporary enlargement was of the same order as that of other glands in lymphadenoma of the Pel-Ebstein variety, but against this was the absence of other evidence of lymphadenoma and of recurrent febrile attacks.

The last and most probable explanation is that the enlarged gland was an example of scrofula. Ulceration of a tuberculous gland through the œsophageal wall has been described. In the present case the pressure exerted by the scrofulous gland was not sufficient to cause ulceration.

"The enlargement of glands from scrofula has now received a measure of explanation at the hands of Ranke. In this case an ordinary radiogram of the chest has revealed the presence of a 'primary complex' which is the first tuberculous lesion of the lung and associated glands, occurring in infancy. It is common in young adult life for blood-strewn reinfection to originate from the glandular part of the primary complex: if at the time of this reinfection an œsophageal gland is reinfected and at the same time is in the second state of allergy described by Ranke, then an exuberant reaction takes place and the gland undergoes marked and sometimes rapid enlargement, as in other examples of scrofula, the subsidence of such swollen glands may be fairly rapid or may take many months." (B. S.)

DISCUSSION.

Mr. T. B. JOBSON suggested the possibility of this being angio-neurotic œdema. Such cases had been described—one by Chevalier Jackson not long ago. In this case the obstruction was very evanescent. There was no other evidence of scrofula.

Mr. TILLEY (in reply) said he thought that Dr. Chevalier Jackson's cases were those in which the mucous membrane of the gullet was affected. In this case there was no swelling of the mucous membrane, only a pressure inwards from without, and bougies passed without any difficulty.

Tuberculosis of the Larynx simulating Cancer—GEORGE W. DAWSON, F.R.C.S.I.—Patient, a man aged 56, had had aphonia for 2 months. Loss of weight 21 lb. Morning cough.

Larynx.—Considerable swelling of left false cord and a greyish swelling of anterior portion of left vocal cord; slight œdema of arytenoids. No temperature, and no tubercle bacilli found.

Treatment.—Sanatorium 2½ months; silence, light and galvano-cautery. The galvano-cautery was applied five times but only after the general condition had been improved by the sanatorium treatment. The swelling has completely disappeared; the patient has recovered

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his voice and weight, and has returned to work after 14 months' treatment.

DISCUSSION.

Sir ST CLAIR THOMSON said that there were one or two useful general principles to be deduced from this case. He had seen the patient when he was in the sanatorium. The condition in the larynx was of the type often mistaken for malignant disease. As to tuberculosis, Mr. Dawson had examined the patient for that before he went to the sanatorium, and neither before nor during his stay there were tubercle bacilli found in his sputum. The diagnosis was made on the clinical appearance; the man had but little loss of weight, and skiagrams showed only a trifling condition at one apex, such as was found in a large number of people. This point of the absence of tubercle bacilli had been brought home to him (Sir St Clair) in the last few days by the report of a case which he had seen in consultation, that of a middle-aged man, who had some dysphagia, and (showing that the laryngologist had not yet entirely come into his own) had had a laparotomy performed to discover why he could not swallow. When he came he had a typical tuberculous epiglottis, and as he had seemed fairly well two months before, and had no bacilli in his sputum, it was hoped that the case might be favourable. But the condition assumed a miliary character, there were large excursions of temperature, and the patient died. Yet he had never had tubercle bacilli in his sputum.

He (the speaker) had seen a fair number of such cases; one, a doctor from the West Coast of Africa, who was said to have malignant disease of the tonsil. He had entered a sanatorium and had died within two months, with a hectic temperature and miliary tuberculosis, yet tubercle bacilli had never been found in his sputum. Another case was that of a Cambridge Blue in Ceylon, where his tonsils were excised, it not being realised that his dysphagia was due to tubercle. He returned to this country, and he (Sir St Clair) had sent him to a sanatorium, where he had died within a few weeks, without having shown tubercle bacilli in the sputum, though they had been recovered from the fæces.

Most middle-aged patients who contracted tuberculosis of the larynx did well, if they were treated seriously. They comprised a large number of the people going about with a mixed diagnosis of pachydermia and chronic bronchitis. They did well if they entered sanatoria, but if they were neglected they were apt to relapse, and if they relapsed they seldom recovered.

Mr. H. V. FORSTER said he had recently had a surprise in such a case, that of a man aged 60 who had always led an open-air life. Neither he nor his doctor had suspected tuberculosis. He had in the anterior commissure of the larynx, more on the right cord than on the left, a neatly defined growth. A senior colleague agreed that it was probably an epithelioma, but advised biopsy. The report on the piece removed by the indirect method stated that though for the most part the epithelial surface was intact, it was in one place ulcerated, and immediately subjacent were several typical tuberculous giant-celled systems, but there was no evidence of epithelioma. A skiagram showed definite phthisis of the right apex, and an indefinite mottling of the left.

Mr. DAWSON (in reply) said that the patient had never shown an increase of temperature; there were no tubercle bacilli and no cough, but there

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was complete loss of voice and a large swelling in the larynx. He regarded the case as one of primary tuberculosis of the larynx. It was generally contended that in tuberculosis of the larynx the lung also was infected, but he did not see why the larynx should not be primarily infected with tubercle.

Erythematous Patch on Soft Palate. ? Pre-carcinoma—Sir JAMES DUNDAS-GRANT, K.B.E., M.D.—Patient, middle-aged man, complaining of pain in the throat, was anxious as to the possibility of cancer, his wife having recently died from "cancer of the throat." There is a vascular erythematous patch occupying the right half of the palate. He smokes a good deal but there is uncertainty as to his holding the pipe invariably in the same side of the mouth. I have seen another case, almost identical in appearance, in which epithelioma developed within a year.

At the last meeting we were discussing pre-cancerous conditions, and we saw many chronic inflammatory conditions of the larynx but only one case in which cancer had developed. This patient has the decayed stump of a tooth, and possibly the removal of this local source of sepsis may cure him.

Congenital Syphilis. Deformity of Nose. Eruption of Teeth into Nose—T. A. CLARKE, M.D.—C. P., a girl, aged 6 years.

Deformity of external nose, and loss of cartilaginous and bony septum. A tooth is seen projecting into the floor of the left nasal vestibule.

History.—The deformity of the nose and loss of the septum occurred twelve months ago. In July 1930, an incisor tooth was removed, with some dead bone, from the nasal cavity and some weeks later another tooth was extruded from the nose. A third tooth was extruded from the nose a few days ago and it is a fourth tooth which is now seen in process of eruption.

The mother's Wassermann reaction is strongly positive.

The case is shown because of the rarity of the dental condition, but there is the further interest that it will be ten years before one can do a permanent plastic operation; meantime, should one be satisfied with a nasal prop to keep the right ala from collapsing?

DISCUSSION.

Dr. W. JOBSON HORNE thought the probability of congenital syphilis being the cause of the condition might be overstated. He regarded it as a congenital malformation.

Mr. W. A. MILL said that about two years ago a similar case was shown by Mr. Mollison, in which a tooth had erupted into the nasal cavity. There was no suggestion of syphilis in that patient. The tooth had caused an atrophic rhinitis and perforation of the septum.

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Royal Society of Medicine

Bleeding Polypus of the Nose—N. ASHERSON, F.R.C.S.—Patient, female, aged 40.

Had profuse epistaxis from the left nostril, spontaneous in onset, arterial in character and continuous. It arose from a granulation the size of a match head, situated in the floor of the nose, just deep to the vestibule. After much trouble the flow was successfully stemmed. When the patient was seen four weeks later, the hæmorrhage had not recurred, and on inspection a hemispherical, blackish sessile swelling the size of a bean was detected. The surface was glistening and the tumour bled on touching. It was tense and resembled a sarcoma.

A skiagram showed the bone in the floor of the nose to be intact. The antrum was not involved. The inferior turbinate and the septum were normal.

After a week's interval the tumour presented a fleshy pale pink flabby appearance, similar to that of ordinary granulation tissue. It was snared off and bleeding was profuse, requiring the pressure of a pack to control it.

On section the tumour was found to be a bleeding polypus, that is to say, a hæmangioma. Dr. Scott Williamson, who examined it, reported as follows:—

"The tumour mass is made up of a very loose fibrous tissue banding a multitude of capillary blood and lymph spaces. It is essentially a plexiform angioma. The fibrous tissue is of an embryonic type with few fibres. The surface is covered by an attenuated stratified epithelium."

The unusual features of the tumour are its origin from the floor of the nose and its altered appearance from time to time.

Dr. JOBSON HORNE said that the term "bleeding polypus" was misleading, and should be discontinued, both on pathological and clinical grounds. The term angioma would be more accurately descriptive of the condition.

FURTHER REPORT OF CASE PREVIOUSLY SHOWN.

Epithelioma of Vocal Cord treated by Thyrotomy in November 1923 (shown April 4, 1924)*—Sir JAMES DUNDAS-GRANT, K.B.E., M.D.—The disease occupied the whole length of the right vocal cord and extended well into the anterior commissure.

In accordance with Chevalier Jackson's recommendation, the thyroid cartilage was divided from without inwards by means of a saw, and the soft parts were freely detached on both sides of the commissure before being divided. The whole of the right vocal cord and a considerable portion of the left one were cleared out. There was no difficulty in swallowing. The voice is rough but is very useful.

* *Proceedings*, 1924, xvii. (Sect. Laryng. 54).

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Societies' Proceedings

February 6, 1931.

President—Mr. Frank Rose, F.R.C.S.

Frontal Sinusitis: A Statistical Investigation — J. S. Fraser and J. P. Stewart, Edinburgh.—The paper is published in the *Journal of Laryngology and Otology*, Vol. xlvi., p. 369, June 1931.

The Treatment of Frontal Sinusitis by Intubation — Douglas Harmer and Bedford Russell.—The paper is published in the *Journal of Laryngology and Otology*, Vol. xlvi., p. 384, June 1931.

The Treatment of Chronic Frontal Sinusitis—Walter Howarth.—The paper is published in the *Journal of Laryngology and Otology*, Vol. xlvi., p. 397, June 1931.

Discussion.

The President said he would like to have answers to the following questions: (1) Did acute frontal sinusitis occur without infection of the antrum? (2) Would not adequate treatment of the antrum obviate direct operation on the frontal sinus? (3) Assuming that a direct operation on the frontal sinus was necessary, was an obliteration operation possible? And, if possible, was it advisable? (4) What were the relative merits of the Howarth and the intubation methods? (5) In the experience of Members, did skin-grafting assist in maintaining drainage?

His own answer to the first question was No, excepting acute catarrhal frontal sinusitis. The answer to question 2 came naturally as a corollary. Therefore the correct procedure in the treatment of recent acute suppuration in the frontal sinus was to treat the antrum first, drain that, and remove the anterior end of the middle turbinate. His answer to question 3 was No. In some cases obliteration was physically almost impossible; and when it could be done it was highly undesirable. With regard to question 4, his feeling was that the real problem to be solved in cases of frontal sinusitis was to find some means of draining the cavity adequately. With regard to the last question he had no experience and so would not express an opinion.

Mr. Harold Kisch, in answer to the President's first question, said that certainly frontal sinus suppuration could occur without antral infection. He had at present under treatment a case in which the antrum was clean and the frontal sinus was full of pus. Question 2 therefore did not arise. As to obliteration, he did not think so many obliteration operations would be tolerated in the south as appeared to have been performed in Edinburgh. His own results had been so good after drainage that he felt that some free drainage method should be tried before submitting patients to an operation which led to considerable deformity. In regard to question 4, he had not carried out the intubation method, neither had he done skin-grafting, as he had always felt it unwise to perform plastic operations in the presence of sepsis.

He had been pleased to see the cases shown by Mr. Negus (see p. 431), but he thought his own were cleaner. Skin-grafting in this region was

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still under trial, and it was necessary to wait and see the results. His own method of operation in frontal sinus cases was as follows and it was safe and easy: A small external incision was made running from the inner canthus to the supra-orbital notch, and the ascending process of the superior maxilla was exposed. All bleeding was stopped. He did not attempt to remove bone until the wound was dry; it was necessary to get a good view of the inside of the nose, and blood running down from outside obscured the view. He then removed the ascending process of the superior maxilla by four chisel cuts, so that the interior of the nose and the frontal sinus orifice were exposed immediately, or, if not, more bone was removed until the exposure was effected. Afterwards any ethmoidal disease was removed and care taken that the opening from the frontal sinus into the nose was free. The removal of the ascending process was the key to these operations; it was that which provided, by taking away the anterior ethmoidal cells, the required drainage. Mr. Howarth removed the orbital plate of the ethmoid, but this he (the speaker) did not think necessary, because the ethmoidal cells could be seen and easily removed. He did not remove any of the floor of the frontal sinus, but the opening was made free by taking away more of the anterior wall.

His results had been very good; the drainage was so free that the patient could put a cannula into his own frontal sinus, and that was sufficient to cure the sinusitis; it was not necessary to remove mucous membrane. The scar was, in most cases, practically invisible.

The best way to make frontal sinus operations safe was (1) to check the hæmorrhage. He always used an injection of adrenalin and novocain externally, the interior of the nose being plugged and replugged under the anæsthetic, and adrenalin gauze placed high up in the nose. (2) To avoid the use of burrs, rasps or curettes; removal was done by chisels or by forceps. (3) To avoid the use of rubber drainage tubes. Following his method, very little after-treatment was required. The sinus was washed out on the fourth day, and occasionally afterwards. Sometimes a bougie was passed to make certain that the way was free.

The stay in hospital after this operation was about a week, the patient being up and about on the fourth day.

Most of his acute frontal sinus cases were treated intranasally, but if it should be necessary to perform an external operation, the method described was a safe one, because the ascending process of the superior maxilla, a non-infected bone, was removed and there was little risk of spreading infection.

Mr. MUSGRAVE WOODMAN said that some experiments on the frontal and other sinuses in animals had been carried out by Dr. Pickworth, Director of the Mental Research Laboratory, Hollymoor Asylum, and himself.

They had been performed on cats, and the general object was to demonstrate (1) the direction of the lymphatic drainage from these sinuses, as shown by intravitam methods, and (2) the occurrence of an extension of a septic focus in these sinuses to the surrounding parts, especially to the meninges.

The experiments were in two groups—(1) Aseptic injection with methylene blue, and (2) injection of organisms into the sinuses. In group

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A, the dye was placed aseptically into the frontal sinus by the intranasal route, without external damage to the scalp or to the walls lining the sinus. As a result it was found that the dye remained *in situ* and when the animal was killed fourteen days later it was not appreciably altered. On the other hand, where damage or leakage had taken place into the scalp when the dye was placed into position by external operation, there was glandular involvement.

He now exhibited a specimen in which methylene blue had been placed in the frontal sinus by external operation, and a little leakage took place into the tissues of the scalp. The animal was killed on the fourteenth day, and the lymphatic glands beneath the jaw on both sides of the neck were seen to be stained deep blue in colour.

Another animal was inoculated by the intranasal route, and by misadventure the needle pricked the inner wall of the frontal sinus, and permitted the staining material to enter the meninges. The specimen he showed clearly illustrated the staining of the brain which resulted.

In group B several specimens were shown in which organisms, especially streptococci, had been inoculated into the frontal sinus. In each case, so long as there was no damage to the walls of the sinus, infection remained *in statu quo*. There was no extension into the meninges, or into the orbit, and no cellulitus of the scalp resulted.

The object of this group of experiments was to find out if there was any spontaneous migration of sepsis from the frontal sinus into the surrounding important areas.

[Mr. Musgrave Woodman showed seven specimens illustrating the experiments described.]

Mr. HERBERT TILLEY said that Mr. Harmer's method was new in technical details, but the general principle of the operation was the same as that which Dr. Lambert Lack introduced at Golden Square, and he (the speaker) remembered that many patients could be seen walking about the ward with a little lead "style" the upper end of which projected from the inner end of the external wound. The "style" was kept in for weeks or even months, until it was surrounded by granulation tissue, and was then removed.

There was a risk in every radical frontal sinus operation, and in advising it one assumed a definite responsibility. The only point he criticised in Mr. Harmer's operation was the long time during which many of these patients had to go about wearing a sign-manual of the surgeon's handiwork; this might be objected to by many sensitive patients.

In answer to the President's first question, he thought that inflammation, in its initial stages, must produce simultaneous infection of all the sinuses. Still, one might often find a residual frontal sinus suppuration when the antral infection had spontaneously recovered. In the same way, sometimes an acute frontal sinus suppuration would subside without surgical intervention. When the external radical operation had been performed and the mucous membrane removed it was six weeks before the patient was cured by complete obliteration of the cavity of the sinus by granulation tissue. Nowadays the mucous membrane was not removed, but was left to recover by establishing free internal drainage into the nasal cavity. As one of the early pioneers in the surgery of the frontal sinus he would like

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to impress on the junior members of the Section the importance of bearing in mind that in every frontal sinus operation the "key situation" was the ethmoid region, because the cross-roads of all the sinuses met there, and if these were obstructed, one would never get the good result hoped for in operations on any individual sinus. If the ethmoid region was effectively treated, whether the operation on the frontal sinus was a Howarth, Killian, Ogston-Luc, or any other, a quicker and better result would be effected on the frontal sinus. A thoroughly efficient drainage of the antero-ethmoidal cells and enlargement of the fronto-nasal canal would frequently be followed, in a longer or shorter time, by cessation of chronic suppuration of the frontal sinus without any radical operation on this air cell. In his (Mr. Tilley's) younger days many of his patients had refused the external operation he had advised, and now they came occasionally, only for the solace of an optimistic report. It was interesting to notice that in many cases the discharge had entirely ceased, in the course of time, while in others there was still some slight suppuration, but not enough to cause either local or distal symptoms of any consequence.

[Mr. Tilley then showed slides illustrating the intranasal and external operations on the frontal sinus. One of these was a skiagram of an acutely inflamed sinus in which a zone of inflamed diploic cells formed the upper boundary of the cavity. To curette such an area would risk exposing it to sepsis with the possible complications of osteomyelitis—often a fatal accident.]

Sir JAMES DUNDAS-GRANT said that the first case at the first Meeting of the Laryngological Society, in 1893, was one of empyema of the frontal sinus, brought forward by him, and it seemed to have been dealt with by a mixture of the operations which had been described to-day (*Proceedings of the Laryngological Society of London*, 1893, i., 1, April). The introduction of a drainage tube, and its maintenance in position for a considerable time, helped greatly in arriving at a good result.

With regard to acute frontal sinusitis, people who were frantic with the pain were sometimes immediately relieved by the removal of the anterior part of the middle turbinated body. He had seen some antrum cases which had cleared up or been cured after one or two irrigations. It was likely that the affection of the antrum which had been cured so quickly had been due to a secondary flow of secretions from the inflamed frontal sinus which, from its vertical position, might have undergone spontaneous cure.

He (the speaker) had shown before the Section some cases of Killian's operation which answered very well. In one such case the disease was bilateral. He had removed a good deal of the ascending process on both sides, and the patient wore tight pince-nez, which the speaker thought were going to be a trouble, but which did not prove so, in spite of the removal of large portions of the ascending processes.

All types of operation had their advantages, and in a few of his own recent cases he had used what might be described as a combination of the methods advised by Mr. Harmer, Mr. Howarth and Mr. Kisch.

Mr. Negus had shown cases which had done well after skin-grafting. Had Mr. Negus thought of a mucous membrane graft? He (the speaker) remembered Mr. Tilley proposing at a Meeting of the Section to carry

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out skin-grafting of the frontal sinus and he, Sir James, had feared that the procedure might encourage the development of cholesteatoma. The operative procedure adopted in any particular case should be decided upon what was found.

Operative Treatment of Frontal Sinusitis.

Mr. T. B. LAYTON said: May I classify frontal sinusitis thus?

I.—Sinusitis with orbital or intracranial symptoms: (*a*) Acute, (*b*) chronic, secondary to either (1) frontal sinus, or (2) ethmoidal cells.

II.—Frontal sinusitis without such sequelae: (*a*) Acute, (1) catarrhal, (2) suppurative. (*b*) Chronic, (1) suppurative, (2) with polypi.

It seems to me just as unpractical to discuss all these different conditions at one time as it would be to discuss acute otitis media and mastoiditis, chronic ear discharge with or without disease of the bone, jugular thrombosis, cerebral abscess and cholesteatoma, all at the same time. My remarks, therefore, refer only to cases that come under II.—(*a*) 1 and 2, and (*b*) 1, which I believe are different stages of same disorder.

My conception of frontal sinusitis is that of Mr. Howarth when he says that "the frontal sinus and the anterior ethmoidal cells are nearly always simultaneously involved"; but I should like to express it differently.

At the upper end of the primitive semilunar groove there are in the new-born infant some four frontal recesses (Parsons Schaeffer) which develop into ethmoidal cells, and these enlarge forwards and upwards to the angle at the junction of the nose and the cranial cavity. One of these passes on to expand the vertical portion of the frontal bone.

It is an inflammation of all these flask-shaped cells which constitutes frontal sinusitis, and this should be considered as a clinical and not as an anatomical entity. If this conception of frontal sinusitis be held, then an inflammation of those other round cells that open under the middle turbinate constitutes an anterior ethmoiditis.

What then is an acute frontal sinusitis? For a paper such as that which Mr. Fraser and Dr. Stewart have put before us, six months is a very useful date to take as the limit between the two; but when the case is before one the difference is one of clinical signs rather than of date, and many cases may be said to have reached the chronic stage before the six months are up.

Now I do not believe that except under the rarest conditions should any set operation, external or internal, be done in a case of acute frontal sinusitis. So rare are these conditions that I have yet to meet a case. I further believe that in every instance *there is greater danger to the life of the patient from the operation than from the disease.*

The only operative treatment that I employ is very gently to wash out the maxillary sinus, which is usually also involved, with a view to removing the greater part of the pus that is poisoning the patient. The only other thing that I will consider is the high resection of the middle turbinate; but nowadays I believe even this to be so dangerous that I am loath to employ it.

To my mind the treatment of chronic sinusitis depends upon two characteristics of the nasal mucous membrane—its stupendous power of swelling up when it is irritated, and its extraordinary power of recovery

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when the cause of that irritation is removed. Now in chronic sinusitis that cause of irritation is the pus poured into the nose either from some other sinus or from the affected one under discussion.

An anatomical point which is but little recognised is the fact that all the openings into the middle meatus can be covered by a shilling and probably by a sixpenny piece; therefore, pus poured into the nose from the maxillary sinus will so cause swelling of the mucous membrane round the openings of the other sinuses that it is the presence of the maxillary sinusitis which prevents the frontal sinusitis from getting well.

The first treatment of frontal sinusitis is, therefore, the treatment of the maxillary sinus by repeated puncture and lavage or, if this fails, by some operation that will divert the pus from the middle meatus to the inferior one. In the majority of cases this will result in the mucous membrane of the middle meatus becoming so much less swollen that the pus can drain away from the cells involved in frontal sinusitis, and no other operative treatment should be attempted until this has been done.

Where this fails, or in the unusual case in which frontal sinusitis is unaccompanied by maxillary sinusitis, the two operations to be considered are the high operation on the deviated septum and the high resection of the middle turbinate. I am not sure even now which is the more important, but of this I am sure—that it is of the utmost importance in each case to decide which is the right one to do. It is an error of judgment on this point which leads to failure and becomes the precursor of the external operation. It is important to remember that the septum must be straightened first or not at all. If interference with the structures of the middle meatus fails to cure the condition before the operation on the septum, it is not likely that this operation will subsequently be of value. This principle is well illustrated in the second of the three cases shown by Mr. Negus to-day (see p. 431).

So far as I have gone it is probable that I am in agreement with the practice both of Mr. Howarth and of Mr. Fraser, but I now want to break a lance with them, for, from their description, I do not believe that either of them does the true high resection of the middle turbinate. And yet this is the most important operation for an inflammation in any of the cells that open into the middle meatus other than the maxillary sinus. Hajek goes so far as to say that the operation is the precursor of an accurate diagnosis in the majority of cases of frontal sinusitis.

It is the piece of bone attached to the lateral wall of the nose immediately behind the upper end of the anterior margin that needs removal. When Mr. Howarth says he removes "the anterior end of the middle turbinate" I doubt whether he gets the right piece, and Mr. Fraser is certainly full of false doctrine when he talks about removing "the anterior end and lower border of" this structure.

When these things are done there are few cases of frontal sinusitis that do not recover, but there are still those other minor intranasal operations such as opening an agger or other anterior ethmoidal cell or biting away a piece of the bulla or of the uncinate process in order more fully to secure drainage in the region of the opening of the fronto-nasal duct. It is only when these have failed that the external operation on the frontal sinus should be done.

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Holding, as I do, these views, my hearers will understand the pain with which I have heard of the new operation that has been described to-day. I have done four external frontal operations for sinusitis in twelve years, the advocates of this operation have done fifty-four in ten. But even if an external operation is necessary this one seems to fail in the primary principle of all external frontal sinus operations. This is that no variety will be of use unless free drainage is secured down into the nose. It is the basis of Mr. Howarth's operation, but the description of this new operation does not suggest that such free drainage is necessarily obtained, and it may be that the "number of failures" can be attributed to this rather than to non-attendance in the out-patient room.

Lastly, may we have an explanation of the pathology of the condition that is labelled "vacuum sinusitis"?

Mr. W. IBBOTSON said that up to ten years ago he had been very much disappointed with most of his results in cases of frontal sinusitis, and had come to the conclusion that he must have been committing some gross error or omitting an important procedure when he found that pain and discharge, though very much relieved by operation, still recurred from time to time. He decided that this was most likely due to his omitting to treat the original source of infection, which, in most cases at any rate, would seem to be in the pharynx. For about the last ten years, however, he had been performing a two-stage operation, and his results has been infinitely more encouraging. The first stage consisted in free external drainage, leaving the wound entirely open, and treating it with non-irritating antiseptics. The second stage was employed for the plastic repair of the wound, and the performance of tonsillectomy. He considered this tonsillectomy (when the tonsils were definitely infected) to be most important, and also largely responsible for the healing by first intention that had been the rule in the majority of his cases. The same rule, he believed, should apply in the operative treatment of mastoid suppuration, and it was very instructive to note that, in many of these cases, he had found that the homolateral tonsil was the more extensively diseased.

Dr. P. WATSON-WILLIAMS said that we had still something to learn in striving for ideal methods of dealing with these cases.

Within the first of the President's questions lay the clue to some of the problems under discussion. He agreed with Mr. Tilley that from the strictly pathological standpoint, acute frontal sinus disease never occurred without antral infection, since acute infective rhinitis always involved the sinuses, but usually followed the common course of these infected conditions in spontaneous recovery. Clinically, however, the term "sinusitis" meant a sinus infection which caused untoward symptoms of special character, and in that sense acute frontal sinusitis often occurred without antral infection. In most cases the determining cause of frontal sinusitis was inefficient drainage or actual obstruction to it, due often to involvement of ethmoid cells or to the arrangement of those cells and so forth. Hence the key-note to success in treatment lay in the removal of the obstruction in the fronto-nasal duct.

The essential difference in the various operations advocated was, that radical operations sought to obliterate the sinus cavity and involved the removal of the mucosa and of the anterior wall.

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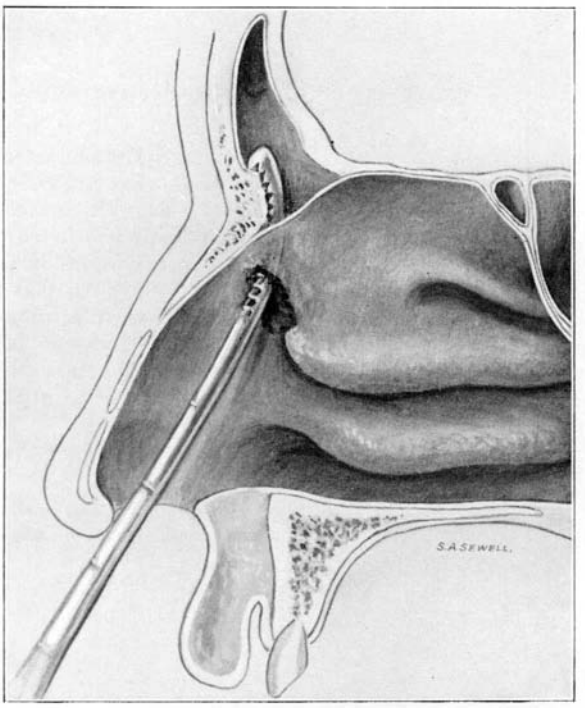


FIG. 1.—Intranasal frontal sinus operation (2nd stage), *i.e.*, after removal of the agger and other ethmoidal cells. The rasp is shown at the bottom of its downward excursion cutting away the nasal crest.

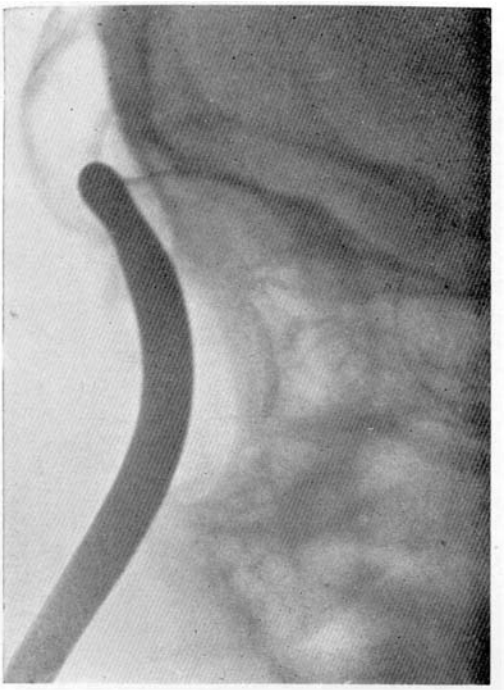


FIG. 2.—Intranasal frontal sinus operation. Skiagram showing that the removal of nasofrontal spur and anterior ethmoidal cells affords good drainage, as it allows the large bougie (18 mm. in circumference) to enter the frontal sinus.

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Conservative operations aimed at establishing drainage, but not at obliteration of the cavity. In both forms of procedure the aim was complete exenteration of the anterior ethmoidal cells and the agger cells and removal of the fronto-nasal spur. The general tendency was to rely as far as possible on conservative methods, whether by "external approach," as in Mr. Harmer's and Mr. Russell's prolonged tubage or Mr. Howarth's operation, or by the "pernasal operation."

Mr. Howarth had warned operators against the removal of the fronto-nasal spur by the pernasal method, because "it would result in the bone reproducing itself and making the stenosis worse than when one started." Yet Mr. Howarth removed it through an external opening, and he (the speaker) did not think that either Mr. Howarth or himself had, in many hundreds of cases, experienced any thickening or reproduction of the bone following its operative removal; it might therefore be no more than surmise.

In acute sinus trouble the great thing was to rely on palliative measures, as there was a tendency to spontaneous recovery. In the acute cases it had been his habit to avoid anything in the nature of an intranasal operation during the acute stage, *i.e.*, until the patient had had the opportunity of developing some local tissue resistance.

He had been interested in Mr. Fraser's results, because he had employed the intranasal method in some acute cases, and in only one did erysipelas result and in another case, scarlatina, and all his patients had recovered. On attacking this region by operation in the acute stage there was some risk of systemic invasion. He would rather trephine the floor of the sinus after external incision to relieve tension.

At a special discussion held by the Section in 1914* on the "Intranasal operative treatment for Frontal Sinusitis," he had described his own technique very fully and had not since found any cause for wavering from the line he took then, except that he now relied on a special rasp for removing the fronto-nasal spur, thus immensely simplifying the operation and avoiding any need for the rotating burrs, chisels, or back-cutting forceps formerly employed. For attacking the agger cells he had always preferred the entry which he now demonstrated on the screen, to that which Mosher introduced. Having removed the ethmoid cells, he passed the rasp up into the frontal sinus very gently, and the rasp would usually enter merely by its own weight. He rasped away the fronto-nasal spur, and the little hook at the top prevented the rasp slipping out during the forcible downward rasping, and thus avoided the risk of injuring the mucous membrane. In the majority of cases one could get good permanent drainage in this way (Fig. 2), and the results were highly satisfactory.

Sir ST CLAIR THOMSON said that his answer to the President's first question was "No, never." Antral invasion was always associated with acute frontal sinusitis. It might clear up first, leaving the frontal sinus suppuration persistent. That was all the more reason for treating the antrum by puncture and lavage in all these cases.

In answer to question 2: Obliteration of the frontal sinus was possible, but not of the fronto-ethmoidal cells. In the cases in which one re-opened

* *Proc. Roy. Soc. Med.*, vii., 7, p. 121 *et seq.*

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and found granulation tissue and pus, he thought this came from the fronto-ethmoidal cells. These frontal sinuses were frequently re-opened and found not to have been obliterated. A French writer had said that there was nothing new except what had been forgotten. If one looked at the publications of Luc in the last century, and the work of Fletcher Ingals in the early part of this, it would be seen that the principle of intubation and drainage differed little from those now described.

Intranasal operation was rarely necessary in acute sinusitis. Surely it was running a grave danger in acute cases, to operate on the middle turbinate and open up the lymphatic spaces which surrounded the fine ends of the olfactory nerve.

Mr. J. S. FRASER, in reply, said he was sorry that so little had been said in the discussion about the fatalities in frontal sinusitis.

To illustrate the fact that one easily forgets one's bad results he might mention that when he thought of bringing the subject before the Section he had said to Dr. Logan Turner, "I do not think I have ever had a fatality as a result of operation on the frontal sinus," and Dr. Logan Turner had replied "Oh yes, you have," and had then instanced a case.

Mr. Tilley had asked how long it was necessary to wait for obliteration. There was no need to wait; the obliteration cases which were successful were successful right away. All mucous membrane was removed and the sinus was packed with iodoform gauze at the operation. This gauze was removed through the nose two days later and the posterior surface of the periosteum was brought into contact with the posterior wall of the sinus and pressure applied with gauze, wool and bandage. There was thus complete obliteration. The resulting deformity depended on the depth and extent of the sinus. He pleaded guilty to having done rather more "obliteration" operations than he cared to look back upon. He and his colleague had confessed in the paper that in the future they would try the Howarth operation more frequently, and would only resort to the obliteration operation when the Howarth operation was not successful.

Mr. Layton was doubtful if he (the speaker) removed the anterior end of the middle turbinate. He could only say that he tried to remove the anterior part of the middle turbinal and open up the agger cells as completely as possible.

In reply to the President, he was sure that there were many acute cases in which the frontal sinus was affected but the antrum was free from sinusitis; such cases had been proved by negative results of puncturing the antrum.

Mr. DOUGLAS HARMER, in reply, said that what impressed laryngologists was the danger in these cases. In acute sinusitis there might be severe swelling, œdema, proptosis, tenderness of the brow, rigors and a high temperature. The condition was as dangerous as an acute appendicitis, and one could not always relieve it by puncturing the antrum or by any intranasal treatment. In such a case an external operation must be performed in order to save life, but he agreed that one must be careful when advising such a radical operation.

It had been hinted that his operation had been described many times before, but his search through the literature had shown him that all the previous operations had been essentially different. In these the passages

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into the nose had been made either by a burr or chisel, the lining of the ducts being thereby removed or destroyed. The essential condition of his method was the dilatation of the duct *without* damaging its lining. If the constriction was very severe the surgeon might not be able to pull the tube through the duct without damage to the membrane, and in such a case he should simply pass a thread through it and leave it for a few days before attempting intubation.

With regard to chronic sinusitis ; some people became more and more ill in spite of intranasal surgery. Their pain could not always be relieved by it ; the general nervous condition sometimes became very serious. In such cases some type of radical operation was a necessity. He believed that intubation caused far less shock and was less dangerous than a radical operation. With the latter, complications occasionally occurred. There might be a spread of inflammation necessitating further operations, and instead of the patient being in bed for a week, he might be laid up for the greater part of a year.

He had been asked whether there was such a thing as "vacuum sinusitis." He was sure that there was. The condition was due to great constriction of the frontal duct and the acute pain was caused by a vaso-motor swelling of the lining membrane, which might occur quite suddenly and close the duct. In such a case on opening the frontal sinus one might find its lining greatly retracted and it might be very difficult to pass even the finest probe through the duct into the nose.

With regard to the ethmoidal cells ; in nearly all the cases described, intranasal surgery had been tried and the ethmoidal cells treated before the external operations were advised.

Mr. WALTER HOWARTH, in reply to Mr. Layton, said he thought that he removed the anterior end of the middle turbinate completely by the use of Sluder's knife. Dealing with Dr. Watson-Williams' remarks about the removal of the nasal spur, he quite agreed that this was important but thought that only a small portion of it could be safely removed by the intranasal method, whereas by the external route the whole bone could be got rid of from front to back. He did not like rasping the bone, with the consequent creation of a raw surface.

Sir St Clair Thomson had said that there was nothing new in these operations. He certainly thought that Mr. Harmer's procedure embodied a new feature in the progressive dilatation. As regards his own operation, the removal of the nasal process of the frontal bone and the ascending process of the superior maxilla to bring the drainage further forward had not been suggested by anyone hitherto and differed considerably from Killian's procedure. The retention of the lining mucosa was also new.

Seven Cases showing results of External Frontal Sinus Operation.—WALTER HOWARTH.

I. A. S., male, aged 28. Right-sided nasal discharge many months. Pain over right eye intense for four weeks. Ethmoid disease with polypi. External operation April 1928. Pus in sinus. Extensive involvement of ethmoid and also of right antrum. No headache or nasal discharge.

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II. T. M., male. This man had a through-and-through wound in the late war, as a result of which both eyes were lost. It was not until seven years afterwards that the suppuration in the right frontal sinus appeared. There was considerable scarring in the ethmoids along the track of the operation. External frontal sinus operation November 1925. Since operation patient has remained free from pain and discharge.

III. F. W., male, aged 28, has had intense headache and nasal discharge. Septum operation and operations for removal of nasal polypi. Came to hospital with acute exacerbation and some external swelling. External operation 1928. No headache or discharge since.

IV. H. G., male, aged 16. External swelling and pain. Extensive ethmoid disease. External operation April 1930. No headache or discharge since.

V. R. J., female, nasal and postnasal discharge for many months. Pain and occasional swelling externally. External operation January 1925. No further headache or discharge.

VI. F. H., male, aged 48. Discharge from right side of nose and postnasally for many months. Severe headache, increasing recently. Swelling of right eyelid intermittently since November. Now marked infiltration and œdema of right eyelid and forehead. Polypi and pus right middle turbinate region. External operation 23rd January 1931. There was a large ragged hole in the floor of the frontal sinus. This was very extensive with numerous galleries. Ethmoid extensively diseased. External incision closed as usual at the end of operation. Œdema of eyelid and forehead settled down completely within a week.

VII. S. B., male, aged 20. Operation for nasal polypi, right and left, two years ago. Now pus left side of nose. Small polypi. Pain and headache. Skiagram shows left sinus opaque. External operation five days ago (1st February). Very small thick-walled sinus full of pus. Most extensive ethmoidal disease necessitating complete removal of the ethmoidal labyrinth from front to back. Tiersch graft.

Two Cases of Multiple Nasal Sinusitis.—HAROLD KISCH, F.R.C.S.

I. Mrs. M. attended at the hospital with a long history of nasal suppuration. The whole of the nasal sinuses have been drained, the frontal sinuses by external antrum operation, the antra by a modified Caldwell-Luc operation.

II. Miss T. had right frontal and antral sinusitis, following typhoid fever. She has had an external frontal sinus operation, and modified Caldwell-Luc antrum operation. She also had a chronic mastoiditis, and this was treated by insertion of a temporal muscle graft.

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Three Cases showing results of External Frontal Sinus Operation combined with Skin Grafting.—V. E. NEGUS, M.S., F.R.C.S.

All operated on by Howarth's method, with the addition of a skin graft applied to the orbital periosteum to prevent subsequent narrowing of the new fronto-nasal opening, as employed by Professor Seiffert in Professor von Eicken's clinic.

Free opening in each case without any dilatation after operation.

I. Female, aged 35. Recurrent swelling and pain over left eye for seven months prior to April 1929, when she attended King's College Hospital with acute frontal sinusitis; red, tender fluctuating swelling over left sinus with temperature of 100°. Left antrum opaque on transillumination.

2.5.29.—Howarth's operation and intranasal antrostomy on left side. 13.5.29.—Skin graft applied to orbital periosteum. No subsequent dilatation.

Pus continued to discharge from left side of nose, but by January 1930, antrum was clear and from the frontal sinus only a few flakes of muco-pus were washed out.

Patient is now quite well, without pain and with very little discharge. The fronto-nasal canal is freely open, but there are a few granulations at its nasal orifice.

II. Male, aged 31. Nose operated on and tonsils removed in 1919, because of frequent colds. Pain appeared over right eye in 1921, and continued in spite of medical treatment and attention to teeth and eyes.

In 1925, right antrum contained pus and was washed out ten times without improvement; symptoms continued intermittently until 1929 in periodical attacks, causing the patient to wake with severe pain, with tenderness over the right frontal sinus.

Ethmoidectomy and partial turbinectomy in January 1929, and submucous resection in June 1929, without improvement. In November 1929, external operation with skin graft to orbital periosteum.

Short attacks of slight pain in April 1930, but none since. Patient still has some thick discharge, but feels well and can play games.

III. Female, aged 54. Severe pain in region of left frontal sinus two and a half years ago, with much swelling at times above left eye. Intranasal operation two and a half years ago, and in December 1929, without improvement. Great pain in May 1930, necessitating external operation, with tube in nostril for three weeks. No improvement.

First seen by exhibitor in October 1930, with severe pain over sinus and on top of head on left side. Right antrum infected; left fronto-nasal duct quite impassable.

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27.10.30.—External operation, with skin graft; no subsequent dilatation.

Fronto-nasal opening is now freely open; there is a little muco-pus on lavage.

Patient still suffers from much nasal discharge, but the original pain is gone, and only occasional pain of a different type, described as "a cold feeling," is noticed.

An Unusual Case of Frontal Sinusitis.—WILLIAM IBBOTSON, F.R.C.S.Ed.

Male, aged 39, first seen 28.3.30.

History. — Left-sided nasal discharge, yellow, non-offensive. Occasional epistaxis (left). Smell diminished; no obstruction; constant left frontal headaches; impaired general health; "nerves," anorexia; disturbed sleep; loss of weight. No night-sweats; slight cough. Left intranasal frontal sinusotomy 1912. No cessation of discharge afterwards. Two years ago an abscess broke out just medial to the left inner canthus; this closed and reopened four or five times and is still discharging; no radiography had been carried out. Patient has one healthy child. No important family history.

On Examination.—Chronic suppurative left frontal, ethmoidal and maxillary sinusitus, confirmed by radiography. Definitely infected tonsils, especially left; two infected teeth in left side of mandible.

Diagnosis.—The suppurating facial sinus together with the history, etc., strongly suggests tuberculosis of the affected sinuses. In my opinion the dental and tonsillar lesions also play an important ætiological part. The condition of neurasthenia that is present may, I think, justly be called "toxic neurasthenia," seeing that it is very largely dependent upon the above lesions.

Treatment.—Dental.

Examination of Chest, April 1930.—Active tuberculosis in both lungs, with positive sputum. Sent to a sanatorium.

21.8.30.—Lungs healed. Negative sputum. Gaining weight. Suppurating facial sinus still open and active. Nasal sinusitis not diminished.

Operation.—Stage 1. 3.9.30. Left conservative external frontal and intranasal ethmoidal and maxillary sinusotomy. No suturing. Anæsthetic: intratracheal chloroform.

Stage 2. 13.9.30. Complete suturing; wound treated with "bipp." Tonsillectomy by dissection. Anæsthetic: intratracheal chloroform.

February 1931.—Recovery was gradual, but pronounced. The wound is well healed, with very little disfigurement, and the discharging facial sinus has long since closed. There is still slight maxillary and

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ethmoidal suppuration, but its character is much more mucoid. General health good; weight steady; patient is carrying on with his work and there are now no signs of neurasthenia.

Remarks.—Unfortunately, I did not obtain a microscopical report on the nasal sinusitis. My own belief is that this successful result was due to the following factors: (1) complete pulmonary recovery before any operation was attempted; (2) performance of the operation in two stages, so as to give the frontal sinus time to recover before closing it over; (3) removal of the dental and tonsillar lesions, especially the latter. This, to my mind, is a point of the utmost importance.

ABSTRACTS

EAR.

Our Eighteenth Century Method of Treating Suppurative Otitis Media: A Criticism and a Remedy. JOHN A. PRATT, Minneapolis. (*Journ. Amer. Med. Assoc.*, 25th October 1930, Vol. cxv., No. 17.)

In reviewing 38 books on Otology published between 1888 and 1929 the writer found that only three suggested a frequent changing of cotton wool; not one described the method of application; two spoke of irrigations; four of irrigations with drying of the canal, and nine mentioned irrigations with drying and a gauze pack for twenty-four hours.

A review of 192 papers written during the same period gave similar findings. The author's method consists in making an evenly wound swab of absorbent cotton wool 1½ inches long. It must be small enough to pass through a medium-sized ear speculum. The swab should be placed in the canal and must touch the drum. It is changed as soon as saturated, and in acute cases it must be changed night and day for the first forty-eight hours. It is claimed that this method reduces pain, promotes rapid recovery and lessens the tendency to mastoiditis and chronic suppuration. The author has a printed card instructing patients how to carry out the treatment themselves. ANGUS A. CAMPBELL.

Therapeutic Indications in Otogenous Infectious Labyrinthitis. J. RAMADIER. (*Les Annales d'Oto-Laryngologie*, January 1931.)

The writer begins by defining clinically the term "otogenous infectious labyrinthitis" as every labyrinthine manifestation due to any anatomical or pathological alteration whatsoever of the region of the

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